

REMARKS

The Office Action dated May 27, 2004, has been received and carefully noted. The above amendments and the following remarks are submitted as a full and complete response thereto.

By this Amendment, claims 1, 4 and 6 have been amended. The Applicants submit that the amendments are fully supported in the specification and the drawings as originally filed, and therefore no new matter has been added. Claims 7-10 are allowed. Accordingly, claims 1-10 are pending in the present application, and claims 1-6 are respectfully submitted for consideration.

The Applicants wish to thank the Examiner for allowing claims 7-10 and indicating allowable subject matter in claims 2, 3/2, and 5/2. Claims 2, 3/2, and 5/2 were not placed in independent form as they depend from claim 1, which is allowable for the reasons submitted below.

Claim 4 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. The Applicants have amended claim 4 responsive to the rejection and submit that all claims are in compliance with U.S. patent practice.

Claims 1, 3/1, 4/3/1, 5/1 and 6 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Pu (U.S. Patent No. 6,034,377) in view of Akiyama. (U.S. Patent No. 6,218,675). Pu was cited for disclosing many of the claimed elements of the invention with the exception of a plurality of scan electromagnets provided on an entrance side of a final deflection electromagnet. Akiyama was cited for curing this deficiency. The Applicants' submit that claims 1, 3/1, 4/3/1, 5/1 and 6 recite subject matter that is neither disclosed nor suggested by the combination Pu and Akiyama.

Claims 1 and 6 recite a plurality of scan electromagnets for one direction provided on an entrance side of a final deflection electromagnet, and kicks provided by the plurality of scan electromagnets are superimposed in said one direction to form a collimated irradiation field at an exit of the final deflection electromagnet.

As a preliminary matter, the Office Action acknowledged that Pu fails to disclose a plurality of scan electromagnets provided on an entrance side of a final deflection electromagnet. As such, Applicants submit that Pu also fails to disclose kicks provided by a plurality of scan electromagnets are superimposed to form a collimated irradiation field at an exit of the final deflection electromagnet.

Akiyama fails to cure the deficiencies in Pu. Akiyama discloses scan electromagnets 100, 110 that work in X and Y directions independently. Namely, the two scan electromagnets 100, 110 are disposed to work in two different directions (in the X- and Y-axes), not for one direction as recited in claims 1 and 6. Therefore, kicks by the two scan electromagnets 100, 110 are not superimposed in said one direction to form a collimated irradiation field, as recited in claims 1 and 6 of the present application. Specifically, as shown in Fig. 5A, identified as “Viewed from Direction Perpendicular to Deflection Plane (Y DIRECTION)”, and Fig. 5B, identified as “Viewed from Deflection Plane Direction (X-Z PLANE DIRECTION)”, the charged particle beam is deflected by the scan electromagnet 100, 110, the bending electromagnet 8, the quadrupole electromagnet 5, and the bending electromagnet 9. And the beam output from each of these different directions is parallel to the design center trajectory. However, the design center trajectories resulting from the deflections caused by the scan electromagnets 100 and 110 are in two different directions. As disclosed by Akiyama:

As shown in FIG. 5A, if the beam is viewed from the direction parallel to the X-Z plane, the phase of the betatron oscillation of the beam deflected by the scanning electromagnet 100 is adjusted by the quadrupole electromagnet 4, and the focal point of the beam is set at the center of the scanning electromagnet 110. The beam which has passed the scanning electromagnet 110 passes the bending electromagnet 8, the quadrupole electromagnet 5, and the bending electromagnet 9, in turn. The beam is deflected by each of these electromagnets when the beam passes it, and the direction of the beam output from the bending electromagnet 9 is parallel to the design center trajectory of the beam. . .

By contrast, as shown in FIG. 5B, if the beam is viewed from the Y direction, the beam deflected by the scanning electromagnet 100 is deflected by each of the electromagnets when it passes the bending electromagnet 8, the quadrupole electromagnet 5 and the bending electromagnet 9, and the direction of the beam output 23 from the bending electromagnet 9 is parallel to the design center trajectory.

See column 8, line 67 to columns 9, line 19 of Akiyama.

As such, the kicks by the scan electromagnets 100, 110 in Akiyama are superimposed in different directions (X-axis and Y-axis), but not in the same direction, specifically, in said one direction, (either the X-axis or Y-axis) as recited in claims 1 and 6. Because Akiyama has only one scan electromagnet for each direction, namely one scan electromagnet 100 for the X-axis, and another scan electromagnet 110 for the Y-axis, Akiyama cannot achieve the effect of the current invention, that is, to form a collimated irradiation field in said one direction by superimposing kicks provided by a plurality of scan electromagnets. As such, the kick provided by each scan electromagnet 100, 110 in Akiyama cannot be superimposed in said one direction, as required by claims 1 and 6. Therefore, Akiyama fails to cure the deficiencies in Pu noted above.

Since neither Pu nor Akiyama disclose or suggest a plurality of scan electromagnets for one direction provided on an entrance side of a final deflection electromagnet and kicks provided by a plurality of scan electromagnets superimposed in said one direction to form a collimated irradiation field, the combination of references fails to disclose or suggest each and every feature of the invention as recited in claims 1 and 6, and therefore, claims 3/1, 4/3/1, and 5/1.

Under U.S. patent practice, the PTO has the burden under §103 to establish a *prima facie* case of obviousness. In re Fine, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Both the case law of the Federal Circuit and the PTO itself have made clear that where a modification must be made to the prior art to reject or invalidate a claim under §103, there must be a showing of proper motivation to do so. The mere fact that a prior art reference could arguably be modified to meet the claim is insufficient to establish obviousness. The PTO can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. Id. In order to establish obviousness, there must be a suggestion or motivation in the reference to do so. See also In re Gordon, 221 USPQ 1125, 1127 (Fed. Cir. 1984) (prior art could not be turned upside down without motivation to do so); In re Rouffet, 149 F.3d 1350 (Fed. Cir. 1998); In re Dembiczak, 175 F.3d 994 (Fed. Cir. 1999); In re Lee, 277 F.3d 1338 (Fed. Cir. 2002). The Office Action restates the advantages of the present invention to justify the combination of references. There is, however, nothing in the applied references to evidence the desirability of these advantages in the disclosed structure.

For at least the combination of foregoing reasons, the Applicants respectfully submit that the combination of Pu and Akiyama fails to disclose or suggest the present invention as claimed in claims 1, 3/1, 4/3/1, 5/1 and 6. Accordingly, the Applicants respectfully request allowance of claims 1-6 and the prompt issuance of a Notice of Allowability.

Should the Examiner believe anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number listed below.

In the event this paper is not considered to be timely filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing Attorney Docket. No. 107292-00023.**

Respectfully submitted,



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